Economic cost of cyanobacterial blooms

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Introduction

Cyanobacterial blooms impact upon the water quality, environmental and ecological status of water bodies and affect most of the uses we make of water. The extent of the impact depends upon the type, size and frequency of the blooms, the size of the water body affected, the uses made of the water and the treatment options available to respond to the blooms. The impacts therefore vary considerably from place to place. Overall costs should also account for the planning and remedial actions taken to prevent future blooms.

Environmental impacts

The environmental impacts include aspects specific to toxic cyanobacteria such as the impact on and accumulation in other organism; and aspects that relate to blooms independent of toxicity such as depletion of oxygen and reduced bio-diversity. The latter can be treated as a symptom of eutrophication and regulated rivers. This is the most difficult area in which to estimate the economic impact, and it can be where the cost of remedial action are greatest and most difficult to achieve. One issue is the extent to which the costs of environmental improvement programs such as improved waste water treatment and land management are included.

Non-extractive uses

Recreational activities such as swimming, fishing and boating are some of the most high profile activites which have most recently been impacted by cyanobacterial blooms. The cost to tourism and local economies can be substantial and include damage to the reputation of recreational amenity areas.

Extractive uses

Toxic cyanobacteria make the water unsuitable for public drinking water supplies, for agricultural water for stock and for irrigation of crops. The economic impact will depend on the alternatives supplies available and the availability and cost of treatment. These costs are better known than those related to environmental or amenity. The main items are discussed below.

Additional monitoring and testing - Emergency responses can require intensive monitoring and testing. Tests may be several hundred dollars each.

Source water management - Management options in reservoirs include artificial destratification, use of algicides, application of flocculants and manipulation of off take levels. Options for managing blooms in rivers are more limited but can include deployment of booms and manipulating river flow rates.

Additional treatment costs - Additional treatment costs can include increased use of chemicals such as chlorine and coagulants or additional treatment steps such as powered activated carbon (PAC)

Costs related to interruption of supply - If treatment is ineffective supplies will need to be shut down. The impact depends largely on the cost of securing alternative supplies. This may be simple as switching to another reservoir or could involve trucking in emergency supplies or supplying bottled water for drinking. Stock may also need to be moved to locations where the water is safe and industry may be forced to suspend operations.

Predicting future costs

In many areas the frequency and composition of blooms varies from year to year. A risk based approach is therefore required for the management of blooms and for the prediction of the economic impact.

Case studies

Examples will be provided of the impact of blooms in Australia. A report to the Land and Water Resources Research and Development Corporation and the Murray Darling Basin Commission estimated the cost of algal blooms in Australia at $180 million to $240 Million per year. The costs were approximately evenly divided between non- extractive and extractive uses.